

### **Remarks**

Claims 1-20 were pending in the application. The Examiner indicated that restriction is required and has indicated that the claims are to be grouped in three (3) groups. A provisional election without traverse was made to prosecute the invention of Group I, which consists of claims 1-8 and 17-20, and that election is hereby affirmed. As a result, claims 9-16 have been withdrawn from consideration. The Applicant has added new claims 21-24 and, as a result, claims 1-8 and 17-24 are currently pending in the application.

Claim 1 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner states that it is not clear how a combination of high density polyethylene (HDPE) with only polystyrene without fiber can result in the claimed composite. In response, the Applicant has modified claim 1 to remove the embodiment consisting only of HDPE and polystyrene. All embodiments now consists of a polyolefin with a thermoplastic polymer-coated fiber component. The Applicant wishes to point out, however, that it is possible to form structural members from a composite consisting of high density polyethylene and polystyrene when blending forms a dual phase morphology wherein the two phases intertwine and remain continuous throughout the material. This is disclosed in U.S. Patents 5,298,214 and 6,191,228, both of which have been incorporated in the application by reference. As a result of the Applicant's modification of claim 1, the rejection under 35 U.S.C. 112, second paragraph, have been traversed.

The Examiner indicates that claims 1-8 and 17-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 5,789,477 (Nosker) in view of U.S. Patent 6,247,651 (Marinelli). Nosker discloses the composite which is utilized in the present invention, that being a composition comprising a high density polyolefin component and a thermoplastic-polymer coated fiber component. The Examiner states that Nosker is silent on the specifics of various structural members which may be constructed

from the composite, but that Marinelli discloses a composite railway tie shaped as an I-beam and, as such, the combination of Nosker and Marinelli renders the present invention obvious.

The Applicant is in disagreement that Marinelli and Nosker 1) would have been combined by one of skill in the art; or 2) teaches, when combined, all elements of the present invention. First, Marinelli teaches away from the use of its ties as structural members because the stiffness required of a structural member is not present in the members disclosed in Marinelli. Marinelli discloses high density polyethylene and rubber composites which cannot handle high loads without deforming. The co-continuous immiscible polymer blend of the present invention will easily handle loads of greater than 600 psi without deforming., while the HDPE and rubber composite of Marinelli will deform with loads less than 200 psi. The Marinelli members lack the required stiffness for use as structural members. High density polyethylene has a modulus of elasticity of approximately 160k, while rubber has a modulus of elasticity of only about 50k. Thus, the addition of the rubber to the HDPE, as disclosed in Marinelli, further reduces the modulus of elasticity of the blend.

The present invention, on the other hand, utilizes a composite which is composed of a high density polyolefin component, such as high density polyethylene with a thermoplastic polymer-coated fiber component which, in the preferred embodiment utilizes polypropylene as the thermoplastic polymer. The blending of the polypropylene coated fibers with the high density polyethylene raises the modulus of elasticity of the blend to above 200k. This blend produces a solid two-phase composite exhibiting a dual phase morphology wherein the two phases intertwine and remain continuous throughout the material. To reflect this property, claim 1 has been amended to include the limitation that the structural members be formed from a “co-continuous immiscible polymer blend.”

This difference in stiffness between the compositions of Nosker and Marinelli represents a disincentive to combine Marinelli and Nosker to produce members capable of carrying structural loads,

as there is no motivation to do so discussed in either reference. Further, the combination will not result in a member capable of being used as a structural member.

In addition, the shape of the member in Marinelli is unsuitable for use as a structural member. For use of a structural member it is desirable that the members be capable of being “nested” as shown in Figure 8 of the present application. That is, an I-beam shaped structural member may have smaller I-beam shaped members nested in the recesses formed by the web and the flange portions wherein the nested I-beams are supported by the bottom most flange portion. This nesting arrangement is not possible with the member of Marinelli because of the  $45^\circ$  angles between the flanges and the interconnecting web section, as the nested members would have a tendency to fall out of the recess of the I-beam of Marinelli due to the sloped surface. Additionally, the Marinelli shape would require that the nested I-beams have ends having a profile which matches the shape of the recess defined by the Marinelli members. As shown in Figure 8 of the present application, it is desirable that the angle between the web portion and the flange portions be  $90^\circ$  to support the nesting feature.

Furthermore, the width of the flange sections are insufficient to support nested structural members therein. The insufficient width of the flange sections or the excess width of the web section makes it impossible to nest structural members as is shown in Figure 8 of the present application and have them be supported therein. As a result, the only use for the shape of the member disclosed in Marinelli would appear to be that of a railway cross tie. As a result, there is no motivation to construct a structural member shaped as shown in Marinelli from the composite shown in Nosker and, even if this were accomplished, it would not result in a member which is suitable for use as a structural member in the construction of, for example, bridges. To make this difference clear, claim 1 has been amended to specify relative measurements of the flange portions and the web portion of the structural members of the present invention.

New claims 21-24 have been added. Claim 21 finds support on page 6, lines 20-25 of the application. Claim 22 finds support in the patents incorporated by reference in the application, namely U.S. Patent 5,298,214, U.S. Patent 5,916,932 and U.S. Patent 6,191,228. Claims 23 and 24 find support in Figure 8 and on page 8, lines 5-14 of the application. Therefore, no new matter has been added as a result of these new claims.

### *Conclusion*

The Applicant respectfully submits that 1) there is no motivation for the combination of Nosker and Marinelli and 2) the combination of Marinelli and Nosker does not produce a member suitable for use as a structural member. Because the shape of the member in Marinelli is unsuitable for use as a structural member, there is no motivation to compose it from the composition of Nosker or to combine the references. Additionally, a beam of the shape disclosed in Marinelli which is composed of the composite disclosed in Nosker will not produce a structural member because the shape of the Marinelli member is unsuitable for use as a structural member because cross-beams cannot be nested within the recess formed between the flange portions and the web portion. The angled surface would cause a cross positioned structural member to simply slip out of the recess. Furthermore, the recess is not deep enough as the width of the flanges is insufficient or the width of the web excessive to provide the proper support of nested structural members.

As a result, the Applicant respectfully requests reconsideration of the rejection of all currently pending claims of the application in light of amendments made herein and the remarks presented. Should the Examiner have any questions, the Applicant requests that the Examiner contact the Applicant's attorney, listed below.

Respectfully submitted,



Dennis M. Carleton  
Reg. No. 40,938  
FOX ROTHSCCHILD LLP  
625 Liberty Avenue, 29<sup>th</sup> Floor  
Pittsburgh, PA 15222  
(412) 394-5568